



# NOAA Fleet Update

## October 2017

The following update provides the status of NOAA's fleet of ships and aircraft, which play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. NOAA's current fleet of 16 ships – the largest civilian research and survey fleet in the world – and nine aircraft, are operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations ([OMAO](#)). OMAO includes civilians, mariners, and officers of the United States NOAA Commissioned Officer Corps ([NOAA Corps](#)), one of the nation's seven Uniformed Services.



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# Hurricanes Irma, Jose, and Maria

## Reconnaissance and Response Flights

OMAO's Hurricane Hunter aircraft – piloted by officers of the NOAA Commissioned Officer Corps - flew a combined 149 hours in support of Hurricane Irma mission taskings; 16.5 hours for Jose; and 106 hours for Maria. The Hurricane Hunter aircraft collected vital data for improving forecasts of these storms.

Following Hurricane Irma, NOAA's King Air flew 54 hours to support the National Ocean Service's Remote Sensing Division (NOS/RSD) emergency response flights to collect imagery in the Florida Keys, southwest Florida from Plantation Island north to Punta Gorda, northeastern Florida from Daytona north to Amelia Island, including inland portions of Jacksonville along the St. Johns River, and coastal areas around Brunswick and Savannah, Georgia, and Hilton Head Island, South Carolina. In all, the King Air surveyed over 1,700 square miles, collecting over 18,000 high-resolution images to aid emergency managers.

Following Hurricane Maria, NOAA's King Air, staged out of Willemstad, Curaçao, has flown 47 hours as of the time of writing this update to support the NOS/RSD emergency response flights to collect imagery in Puerto Rico, the U.S. Virgin Islands, and the British Virgin Islands. So far, the King Air surveyed 770 square miles, collecting over 15,000 high-resolution images to aid emergency managers.

Imagery collected is available online at <https://storms.ngs.noaa.gov/>



**LCDR Matthew Nardi pilots OMAO's King Air over impacted areas after Hurricane Irma.**

[Photo: NOAA]



# OMAO and the NOAA Corps – In the News

## [See What it's Like to Fly Inside Hurricane Irma](#)

-TIME

The National Oceanic and Atmospheric Administration, or NOAA, sent "Hurricane Hunter" aircraft over the Atlantic on Tuesday to get a closer look at Hurricane Irma. The storm, now a Category 5, made landfall in the Caribbean early Wednesday.

## [Watch Daredevils Fly Into a Hurricane for Science](#)

-National Geographic

To peer inside the workings of hurricanes like Irma and Harvey, weather forecasters must make a daring move—flying into the eye of the storm. Hurricane Hunters fly through hurricanes, dodging heavy rains and sometimes lightning and hail.

## [Irma intensifies to an 'extremely dangerous' Category 5 hurricane on its track toward the U.S.](#)

-Washington Post

Hurricane Irma strengthened overnight to a dangerous Category 5 as it barrels toward the Greater Antilles and Southern Florida. It's likely that Hurricane Irma will affect the U.S. coast — potentially making a direct landfall — this weekend. Tuesday morning, NOAA Hurricane Hunters found the storm's maximum wind speeds are 175 mph. It now ranks among the strongest hurricanes ever recorded in the Atlantic Ocean. Forecasts suggest it will reach southern Florida and the Gulf of Mexico this weekend.

## [Fearless NOAA Pilots Fly Into the Eye of Hurricane Irma](#)

-Popular Mechanics

The worst turbulence you've ever gripped your armrests through is nothing compared to what NOAA's Hurricane Hunters fly directly into. Yesterday, before Hurricane Irma made landfall in the Caribbean, the Hunters went out for a rendezvous, flying through the tumult and into the eye of the storm. The footage, posted to Twitter, is incredible.

## [Aboard NOAA Ship, Challenges and Adventure While Mapping Sea Floor](#)

-KNOM

Summer is the busy season for marine research in the waters of Western Alaska, and that means plenty of ship traffic through the Port of Nome. One such ship is the National Oceanic and Atmospheric Administration (NOAA) vessel *Fairweather*, which recently made a third stop in Nome during a mission to map the ocean floor. KNOM's Gabe Colombo took a closer look at the people behind the operations.

## [Tracking Hurricane Irma from above with a flight crew from NOAA](#)

-Tampa Bay Times

Ian Sears stands in the cavernous hangar of the new NOAA Aircraft Operations Center at the Lakeland-Linder Regional Airport and plots out the next ten hours of his life. With Hurricane Irma blasting its way across the Caribbean and headed toward Florida, Sears is about to join eight other members of a crew helping predict just where the deadly storm would hit.



# 100<sup>th</sup> Anniversary of the NOAA Corps



Celebrating a Century of Service on May 22 (1917-2017)

Faced with tough national security and economic challenges and a natural world governed by powerful and mysterious forces that often threatened life, property, and commerce, President Thomas Jefferson signed a bill creating a new federal agency in 1807 that would support the nation's defense, promote the well-being of its citizens, and unlock nature's secrets. The new agency's mission was to chart the nation's coastal waters to ensure that ships could move civilians, troops, and materiel safely.

During the next 150 years, that agency, the Survey of the Coast (later the Coast & Geodetic Survey or C&GS), would prove itself in war as well as in peacetime. With America's entry into the World War I, a commissioned service of the C&GS was formed in 1917 to ensure the rapid assimilation of C&GS technical skills for defense purposes. During World War II, officers and civilians of the C&GS produced nautical and aeronautical charts, provided critical geospatial information to artillery units, and conducted reconnaissance surveys.

Today, the work of the C&GS—and more—is conducted by the National Oceanic and Atmospheric Administration (NOAA) and the NOAA Commissioned Officer Corps—one of the seven uniformed services of the United States. The direct descendants of the C&GS, NOAA and the NOAA Corps work every day to keep the nation secure and productive by providing products and services that support maritime domain awareness; help ensure safe passage of commercial and military traffic on our nation's waterways; warn mariners, aviators, and the public of severe weather; aid search and rescue efforts; and conserve and protect our natural resources.

Continuing in the tradition of their C&GS predecessors, NOAA Corps officers continue to play a vital role in the acquisition and analysis of environmental data that aid NOAA and other agencies in meeting the national security, economic, and environmental challenges of the 21st century. NOAA Corps officers command ships that scan the seafloor for potential hazards to shipping, monitor oceanographic and atmospheric conditions, and study ocean resources. They also operate highly specialized aircraft that collect environmental and geographic data necessary for weather and flood prediction, nautical and aeronautical charting, disaster response, and resource management.







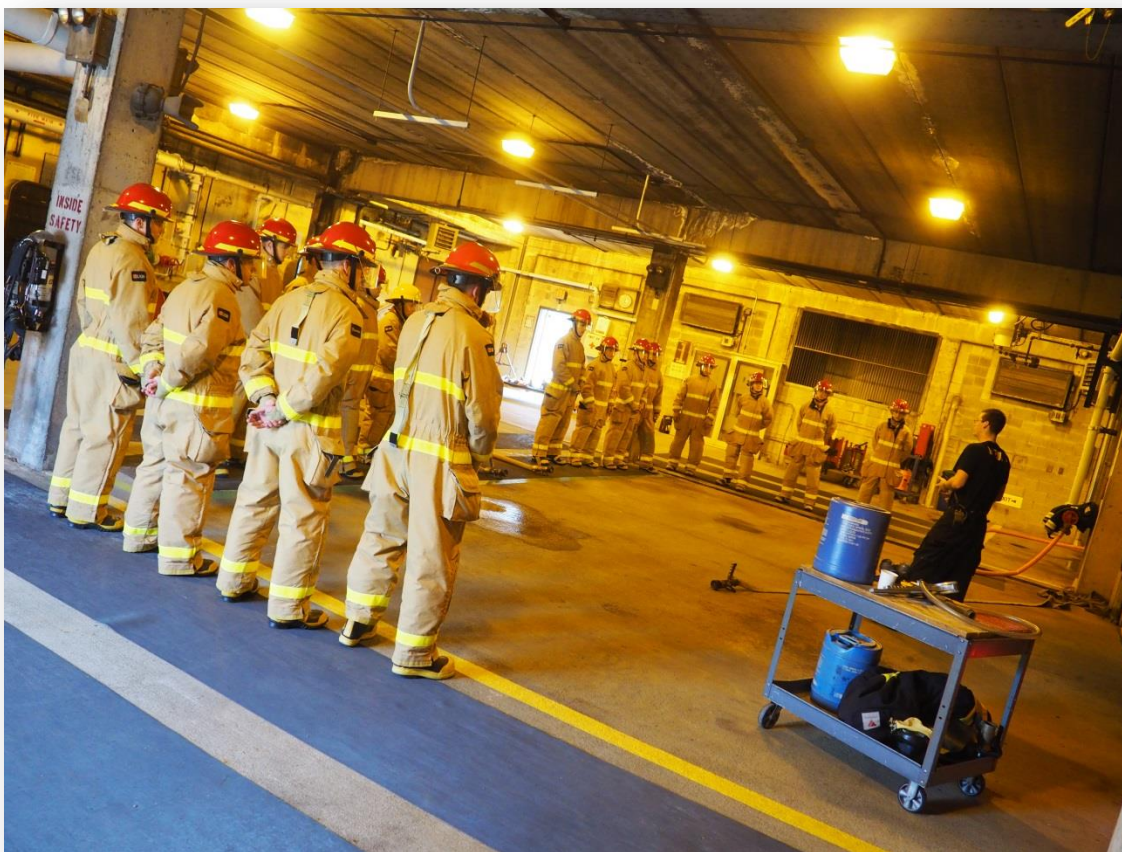
# Basic Officer Training Class (BOTC)



## Class 130

The students from BOTC 130 have been making huge strides in their teamwork, professionalism, health and physical readiness, and overall development in their journey toward officership alongside their Coast Guard counterparts. The Officer Candidates have been actively involved in a wide array of hands-on training in the past few weeks, including Fire Fighting, First Aid/CPR, and two weeks underway aboard USCGC *Eagle*.

The Officer Candidates have been researching the ships and learning about their missions. They will receive their assignments at Billet Night on October 13, 2017.



Officer Candidates receive instruction in basic fire fighting at Naval Station Newport, Rhode Island.

[Photo: NOAA]



# FY 2018 Ship Fleet Budget Request



The President's Budget Request for NOAA includes \$75 million in FY 2018 as part of an ongoing multi-year NOAA ship fleet recapitalization initiative. Since 2007, the NOAA fleet has declined from 19 ships to the current fleet of 16 ships. Without recapitalization, the fleet will decrease to eight ships by 2028. In FY 2018, funding will support construction of a second NOAA vessel (N/V) Class A. This vessel will be a variant of the Navy's existing Auxiliary General Oceanographic Research vessel, serving a primary mission of oceanographic monitoring, research, and modeling. NOAA will also continue planning for additional ships. New ship construction consists of four acquisition phases: requirements analysis, concept design, preliminary design, and detailed design and construction. Efforts will be made throughout the process to leverage design aspects of previous ship classes and to create standardization across the fleet to meet multiple core mission requirements.

We thank Congress for the fleet recapitalization support received in FY 16 (\$80 million) and FY17 (\$75 million).

## **Fleet Recapitalization Resources**

[OMAO Fleet Recapitalization - Building NOAA's 21st Century Fleet](#) [March 2017 - PDF 2.1 MB]

[OMAO Fleet Recapitalization Questions and Answers \(Q&As\)](#) - [PDF]

[NOAA Fleet Independent Review Team Final Report](#)

[The NOAA Fleet Plan: Building NOAA's 21st Century Fleet](#) [PDF 7.5 MB]

## **NOAA Budget Request Resources**

[FY 2018 NOAA Congressional Justification](#)

[FY 2018 Bluebook](#)

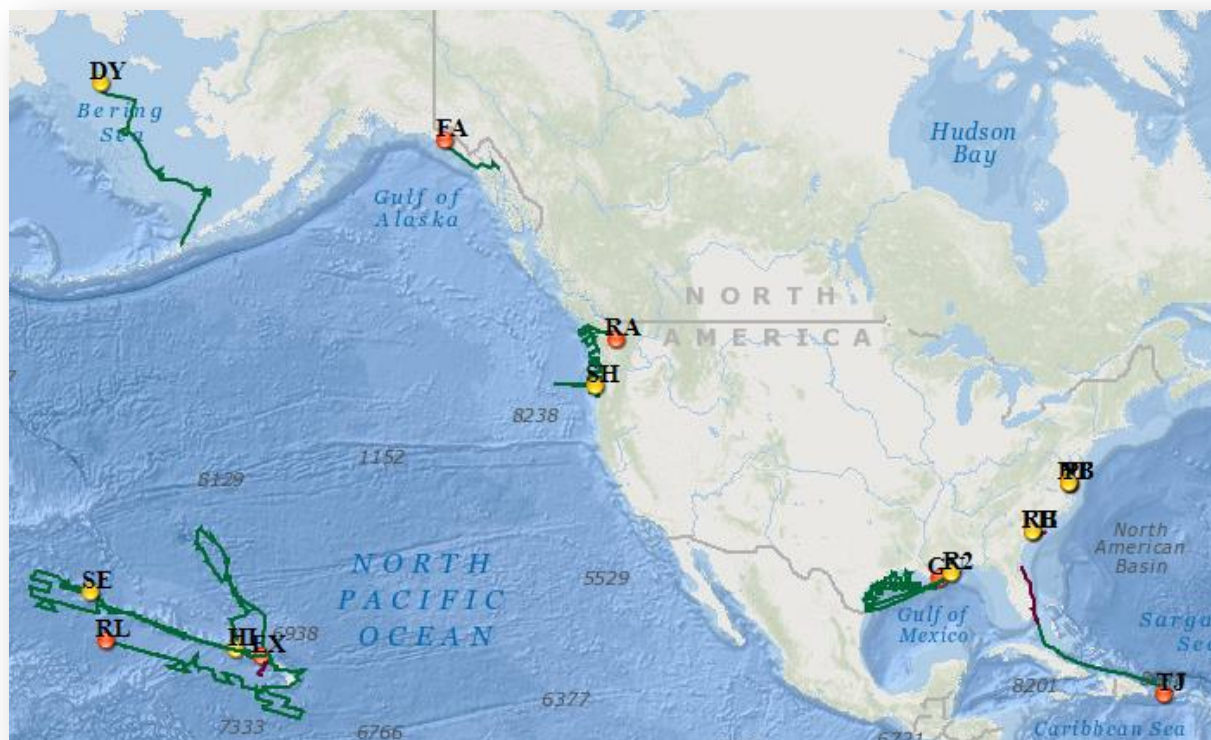




# OMAO's Ships and Centers



OMAO's [Ship Tracker](#) (screen shot below) shows information about the location - present and past - of our fleet of research and survey ships. Please note: To access Ship Tracker you must create an account with a **.gov** or **.mil** email address. All other access is restricted.



OMAO's ships and related Marine Centers are listed below based on the geographical location of the vessels' homeports starting in the Northeast and ending in the Pacific.

## **New Castle, NH**

### **NOAA Ship *Ferdinand R. Hassler***

**Commanding Officer:**

LCDR Matthew Jaskoski

**Primary Mission Category:**

Hydrographic Surveys

**Depart:** Norfolk, Virginia

**Arrive:** Charleston, South Carolina

**Project:** Approaches to Jacksonville

**Objectives:** To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.

## **Newport, RI**

### **NOAA Ship *Henry B. Bigelow***

**Commanding Officer:** CDR Jeff Taylor

**Primary Mission Category:** Fisheries Research

**Temporary Location:** Norfolk, Virginia

**Ship Status:** Ship is in in Norfolk, Virginia, undergoing emergency repairs to the main propulsion system.

- Repairs required dry docking of the ship, removing the motor through the side of the hull, and shipping the motor to a repair facility in Ohio.
- Due to lead times on the manufacturing of replacement motor components, which are custom-made due to acoustic quieting requirements, the estimated time of repair completion has shifted to **November**.
- Mitigation strategies, including analysis of opportunities to conduct the New England Fall Bottom Trawl Survey on other NOAA vessels, are being pursued collaboratively by OMAO and NMFS:
  - Two Northeast Fisheries Science Center research cruises planned for July and August have been cancelled. However one, that for sea turtles and marine mammals, will be conducted later this year aboard the R/V Hugh Sharp, operated by the University of Delaware.
  - The NOAA Ship *Pisces* will be available for some of the originally planned bottom trawl survey dates.

## **Davisville, RI**

### **NOAA Ship *Okeanos Explorer***

**Commanding Officer:** CDR Eric Johnson

**Primary Mission Category:** Oceanographic Exploration and Research

**Depart:** Honolulu, Hawaii **Arrive:** Panama City, Panama

**Project:** Eastern Pacific Mapping

**Objectives:** The ship will conduct preliminary seafloor mapping operations to contribute to geological understanding of remote areas of the Pacific Ocean. The ship will also test the operation of a newly developed nitrogen sensor that was funded by an Office of Exploration and Research grant to the University of Washington Applied Physics Laboratory to measure biologically produced excess nitrogen in the Eastern Tropical north Pacific.

## **Norfolk, VA**

### **NOAA Ship *Thomas Jefferson***

**Commanding Officer:** CDR Christiaan van Westendorp

**Primary Mission Category:** Hydrographic Surveys

**Depart:** Port Everglades, Florida **Arrive:** Offshore Puerto Rico, port call TBD

**Project:** Emergency Response, Puerto Rico & U.S. Virgin Islands

**Objectives:** The ship will conduct hydrographic surveys of deep-draft ports of Puerto Rico and the U.S. Virgin Islands, critical for opening ports for bringing relief supplies to those affected following Hurricane Maria. The ship will support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.



Officers of NOAA Ship *Thomas Jefferson* en route to Puerto Rico to support Hurricane Maria response.

[Photo: NOAA]

### OMAO'S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A)

#### **CAPT Scott Sirois, Commanding Officer MOC-A**

MOC-A serves as a homeport for one NOAA ship. Its personnel provide administrative and logistical support, and manage the day-to-day operations, for the research and survey ships in NOAA's Atlantic fleet. Each year, these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

### **Charleston, SC**

#### **NOAA Ship *Nancy Foster***

**Commanding Officer:** Master Donn Pratt  
**Primary Mission Category:** Oceanographic Research, Environmental Assessment  
**Depart:** Charleston, South Carolina **Arrive:** New York, New York  
**Project:** Habitat Mapping for Renewable Energy Sites

**Objectives:** The National Centers for Coastal Ocean Science, Marine Spatial Ecology Division will be conducting a scientific research mission onboard NOAA Ship *Nancy Foster* funded by Bureau of Ocean and Energy Management (BOEM). The purpose of the cruise will be to collect swath bathymetry and fishery acoustics in coastal water of New York to assist BOEM in characterizing geophysical and ecological conditions of the New York Call Area renewable energy site.

#### **NOAA Ship *Ronald H. Brown***

**Commanding Officer:** CAPT Kurt Zegowitz  
**Primary Mission Category:** Oceanographic Research, Environmental Assessment  
**Ship Status:** Ship will be in a scheduled dockside maintenance period in Charleston, South Carolina through the month of October, returning to service in November.

## **Pascagoula, MS**

### **NOAA Ship *Pisces***

**Commanding Officer:** CDR Nicholas Chrobak  
**Primary Mission Category:** Fisheries Research  
**Depart:** Norfolk, Virginia **Arrive:** Newport, Rhode Island  
**Depart:** Newport, Rhode Island **Arrive:** Newport, Rhode Island  
**Project:** Autumn Multispecies Bottom Trawl Survey

**Objectives:** The ship will conduct bottom trawls in an area covering the continental shelf waters of Georges Bank and the Gulf of Maine to the Western Scotia Shelf (including areas in Canada's Exclusive Economic Zone) to determine the autumn distribution and relative abundance of fish and invertebrate species.

### **NOAA Ship *Oregon II***

**Commanding Officer:** CAPT Dave Nelson  
**Primary Mission Category:** Fisheries Research  
**Depart:** Pascagoula, Mississippi **Arrive:** Galveston, Texas  
**Depart:** Galveston, Texas **Arrive:** Pascagoula, Mississippi  
**Project:** Southeast Area Monitoring and Assessment Program (SEAMAP) Fall Groundfish Survey

**Objectives:** Scientists from the Southeast Fisheries Science Center, Tulane University, and Texas A&M University - Corpus Christi ship will sample the northern Gulf of Mexico from the south Texas coast to the south Florida, using trawling gear to determine the abundance and distribution of benthic fauna.

### **NOAA Ship *Gordon Gunter***

**Commanding Officer:** CDR Lindsay Kurelja  
**Primary Mission Category:** Fisheries Research  
**Depart:** Pascagoula, Mississippi **Arrive:** Newport, Rhode Island  
**Project:** Gulf of Maine Harmful Algal Bloom

**Objectives:** Scientists from the NOAA National Centers for Coastal Ocean Science and Woods Hole Oceanographic Institution will collect sediment cores at stations in the Gulf of Maine from New Hampshire to the Bay of Fundy to sample for cysts of *Alexandrium fundyense*, commonly known as the New England "red tide," a Harmful Algal Bloom (HAB) species that requires careful management of shellfish resources to prevent paralytic shellfish poisoning in New England and Canadian coastal waters. The abundance of these cysts is a strong predictor of the magnitude of HAB bloom events the following year.

## **San Diego, CA**

### **NOAA Ship *Reuben Lasker***

**Commanding Officer:** CDR Kurt Dreflak  
**Primary Mission Category:** Fisheries Research  
**Depart:** Honolulu, Hawaii **Arrive:** Honolulu, Hawaii  
**Project:** Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS)

**Objectives:** The HICEAS project is a marine mammal and seabird assessment survey of the waters of the Hawaiian island Chain extending offshore to the limits of the U.S. Exclusive Economic Zone. The overall objective of the HICEAS project is to estimate the abundance and understand the distribution of dolphins, whales, and seabirds found in the waters around the Hawaiian Islands. Biopsy data and aerial photography from unmanned aerial systems will help scientists better understand population demography and genetic structure, and biological and oceanographic data will be collected to better characterize the study area environment.



## Newport, OR

### NOAA Ship *Rainier*

**Commanding Officer:** CDR Ben Evans  
**Primary Mission Category:** Hydrographic Surveys  
**Depart:** Seattle, Washington **Arrive:** San Diego, California  
**Project:** Channel Islands and Vicinity, California

**Objectives:** To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.

### NOAA Ship *Bell M. Shimada*

**Commanding Officer:** CDR Paul Kunicki  
**Primary Mission Category:** Fisheries Research  
**Depart:** Newport, Oregon **Arrive:** San Diego, California  
**Depart:** San Diego, California **Arrive:** San Diego, California  
**Project:** Advanced Tech to Survey Rockfishes

**Objectives:** The ship will use an autonomous underwater vehicle (AUV) as part of an underwater experiment to observe and quantify the behavior of rockfishes in reaction to mobile survey vehicles in rocky, untrawable habitat. Using the ship's ME70 sonar, the ship will also acquire high-resolution bathymetric data around the northern Channel Islands.

## OMAO'S MARINE OPERATIONS - NATIONAL SUPPORT

### CAPT Todd Bridgeman, Director of Marine Operations

#### Mr. Troy Frost, Deputy Director of Marine Operations

OMAO's Marine Operations oversees the operations of OMAO's ships and the three regional Centers, including the Marine Operations Center-Pacific, Marine Operations Center-Atlantic, and Marine Operations Center-Pacific Islands. Employees of Marine Operations are stationed nationwide to provide strategic, administrative, engineering, maintenance, electronic, budgetary, and personnel support to the OMAO fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

## OMAO'S MARINE OPERATIONS CENTER – PACIFIC (MOC-P)

### CAPT Keith Roberts, Commanding Officer MOC-P

MOC-P serves as a homeport for two NOAA ships. Its personnel provide administrative and logistical support, and manage the day-to-day operations, for the research and survey ships in NOAA's Pacific fleet. Each year, these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean. MOC-P also serves as the home of OMAO's Marine Operations.

## Ketchikan, AK

### NOAA Ship *Fairweather*

**Commanding Officer:** CDR Mark Van Waes  
**Primary Mission Category:** Hydrographic Surveys  
**Depart:** Juneau, Alaska **Arrive:** Skagway, Alaska  
**Depart:** Skagway, Alaska **Arrive:** Ketchikan, Alaska  
**Project:** Southeast Alaska Survey

**Objective:** To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation as identified during the course of survey operations.



A spectacular display of Aurora Borealis greets NOAA Ship *Fairweather* as she departs the Arctic for Southeast Alaska.

[Photo: LT Manda/NOAA]

### **Kodiak, AK**

#### **NOAA Ship Oscar Dyson**

**Commanding Officer:**

CDR Michael Levine

**Primary Mission Category:**

Fisheries Research

**Depart:** Kodiak, Alaska

**Arrive:** Bellingham, Washington

**Depart:** Bellingham, Washington

**Arrive:** Newport, Oregon

**Project:** Eco-FOCI Fall Mooring Cruise

**Objectives:** The ship will recover and deploy surface and subsurface oceanographic moorings that focus on improving fisheries stock assessments and ecosystem assessments in the Bering Sea through the collection of fisheries acoustics information, zooplankton, and physical oceanographic data.



## **Honolulu, HI**

### **NOAA Ship *Hi'ialakai***

**Commanding Officer:** CAPT Elizabeth Kretovic

**Primary Mission Category:** Oceanographic Research, Environmental Assessment

**Ship Status:** The ship will undergo annual fleet inspection and scheduled dockside maintenance period through January of 2018.

### **NOAA Ship *Oscar Elton Sette***

**Commanding Officer:** CDR Donald Beaucage

**Primary Mission Category:** Fisheries Research

**Depart:** Honolulu, Hawaii

**Arrive:** Honolulu, Hawaii

**Project:** Hawaiian Islands Cetaceans

**Objectives:** The ship will conduct scientific operations in the waters surrounding the Hawaiian Island Chain, conducting visual surveys of cetacean distribution and composition, collect skin biopsies and satellite tagging for investigations of stock structure, and collect photographs for individual identification to document geographic variation in dolphin morphology and health. Scientists will also recover and deploy a High-Frequency Acoustic Recording Package at three offshore locations near Kona, Kauai, and Pearl and Hermes Atoll.



**Melon-headed whales (*Peponocephala electra*) as seen from NOAA Ship *Oscar Elton Sette*.**

[Photo: NOAA Pacific Islands Fisheries Science Center under scientific permit]

## **OMAO'S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI)**

**CAPT Robert Kamphaus, Commanding Officer MOC-PI**

MOC-PI serves as a homeport for two NOAA ships. Its personnel provide administrative and logistical support, and manage the day-to-day operations, for the ships in NOAA's Pacific Islands fleet and for ships operating in the Western Pacific. Each year, these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.



# OMAO's Aircraft



## Lakeland, FL

### WP-3D (N42RF) – “Hurricane Hunter”

**Current Mission:** Hurricane Season

The NOAA Hurricane Hunter aircraft are ready to respond. Radar reconnaissance missions on the NOAA WP-3D aircraft will be conducted to support tropical cyclone forecasting and the Hurricane Forecast Improvement Project. These flights will use the WP-3D's tail Doppler radar system to obtain high-density, three-dimensional measurements of the inner core wind structure of each tropical cyclone, potentially throughout its full life cycle. The hurricane research missions will also use the WP-3D to support the calibration/validation of satellite measurements and instrumentation development for the tropical cyclone environment and sampling of other aspects of the tropical cyclone inner core. These measurements will be used to enhance the accuracy of track and intensity guidance generated by NOAA's numerical weather prediction models. They will also be used directly by NOAA's National Weather Service hurricane specialists with the ultimate outcome being improved accuracy of intensity and track forecasts, extended forecast/warning lead-times and improved confidence levels by decision makers.

### WP-3D (N43RF) – “Hurricane Hunter”

**Temporary Base:** Jacksonville, Florida

**Current Mission:** Scheduled Maintenance

The aircraft was inducted into re-winging in March. No additional projects are planned on this airframe until re-wing is complete in fall 2018.

### Gulfstream IV (N49RF) – “Hurricane Hunter”

**Current Mission:** Hurricane Season

NOAA's Gulfstream IV aircraft stands ready to support operational tropical cyclone forecasting and the Hurricane Forecast Improvement Project, based out of its new home in Lakeland, Florida. The G-IV is the primary aircraft for surveillance missions. The radar reconnaissance missions will use the G-IV's Tail Doppler Radar (TDR) system to obtain high-density, three-dimensional measurements of the inner core wind structure of tropical cyclones, potentially throughout its full life cycle. NOAA's National Weather Service is seeking to gather data on the performance of the TDR observation system and will work with the Hurricane Research Division to develop observing strategies for maximizing the utility of the TDR with the goal of improving hurricane track and intensity forecasts.

### Jet Prop Commander (N45RF)

**Temporary Base:** Various Locations

**Current Mission:** Soil Moisture/Snow Survey

NOAA's Jet Prop Commander aircraft will continue supporting the snow survey mission, using specialized detection equipment to make accurate, real-time measurements of snow water content across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy.

### Twin Otter (N46RF)

**Temporary Base:** Various Locations

**Current Missions:** Soil Moisture/Snow Survey

N46RF will use specialized detection equipment to make accurate, real-time measurements of soil moisture content across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy. The benefits of accurate soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

### **Twin Otter (N48RF)**

**Temporary Base:** Various Locations in Florida

**Current Mission:** Coastal Mapping

The aircraft completed Hurricane Irma response flights and will resume TopoBathy Lidar (light detection and ranging) mission will collect data in the coastal zone used to produce the most up-to-date and accurate marine navigation charts, FEMA flood plain and inundation maps, and other Integrated Ocean and Coastal Mapping (IOCM) applications. Data gathered will help ensure safe and efficient marine transportation and benefit coastal communities with accurate resource management and aid emergency response efforts.

### **Twin Otter (N56RF)**

**Temporary Base:** Various Locations

**Current Missions:** Southeast Atlantic Marine Assessment Program for Protected Species

N56RF will support the Southeast Atlantic Marine Assessment Program for Protected Species (SE AMAPPS). The purpose of the SE AMAPPS survey is to provide data for NOAA Fisheries, the Bureau of Ocean Energy Management; and the United States Navy so that each agency can meet its obligations under the Endangered Species Act, Marine Mammal Protection Act, and National Environmental Policy Act (NEPA). Each agency is subject to litigation and possible delays or stoppage of fisheries, energy development and military activities without current information. The objective of this project is to provide information on the distribution and abundance of marine mammals and turtles throughout the year. The survey will be flown from New Jersey to Florida.

### **Twin Otter (N57RF)**

**Temporary Base:** Calgary, Alberta, Canada

**Current Mission:** Scheduled maintenance period

The aircraft will undergo scheduled maintenance and corrosion inspection at Rocky Mountain Aircraft in Calgary, Alberta through February 2018.

### **King Air (N68RF)**

**Temporary Base:** Various Locations

**Current Mission:** Hurricane Response and Continuous Coastal Mapping

The aircraft concluded Hurricane Harvey and Irma response flights, and is currently tasked with Hurricane Maria response missions. Upon conclusion of emergency response tasking the aircraft will return to the Coastal Mapping mission. Coastal Mapping is an on-going mission of NOAA's National Geodetic Survey (NGS) to survey approximately 95,000 miles of United States coastline providing the Nation with an accurate, up-to-date and seamless database of the national shoreline. This data is the sole source of shoreline depicted on NOAA's nautical charts. It is also the baseline for defining America's marine territorial limits, including its Exclusive Economic Zone, and for the geographic reference needed to manage coastal resources and support marine navigation. In addition, the Coastal Mapping Program supports NOAA's homeland security and emergency response requirements by rapidly acquiring and disseminating a variety of datasets to federal, state, and local government agencies as well as the general public.

## **OMAO'S AIRCRAFT OPERATIONS CENTER (AOC)**

### **CAPT Nancy Hann, Commanding Officer AOC**

The AOC, located at Lakeland Linder Regional Airport in Lakeland, Florida, serves as the main base for OMAO's fleet of nine aircraft and provides capable, mission-ready aircraft and professional crews to the scientific community. Whether studying global climate change or acid rain, assessing marine mammal populations, surveying coastal erosion, investigating oil spills, flight checking aeronautical charts, or improving hurricane prediction models, the AOC flight crews continue to operate in some of the world's most demanding flight regimes.



**NOAA WP-3D (N42RF) takes off from OMAO's Aircraft Operations Center in Lakeland, Florida, en route to a reconnaissance mission into Hurricane Maria.**

[Photo: NOAA]



# Unmanned Systems Support



## *NASA Global Hawk*

**Location:** Edwards Airforce Base

**Mission:** Scheduled Inspection and Maintenance

Integration of new equipment in the Global Hawk aircraft and Ground Control Stations has been accomplished to allow the project to communicate with the I4 INMARSAT satellite constellation since the decommissioning of the I3 INMARSAT satellite constellation in December 2016. INMARSAT serves as a command and control link for Global Hawk flight operations. Testing of this recently implemented system is in progress. NASA's 872 Global Hawk is supporting science missions this summer as part of a NASA project to train new engineers through preparing and executing flights against cyclonic storms in the Pacific, Gulf, Caribbean, and Atlantic regions. The project recently flew a mission over Tropical Storm Franklin in the Bay of Campeche. The instrument suite includes NOAA's SO<sub>2</sub>, O<sub>3</sub>, and NCAR's AVAPS instruments. Six 24-hour mission flights are planned with NOAA as a key science and flight operations participant.

NASA 874 Global Hawk is currently in refurbishment. System tests have progressed well and the aircraft is being prepared for engine run tests next. A Functional Check Flight is planned for the beginning of 2018. Mission plans and FAA COAs are in process to support the Fall 2017 missions as well as groundwork for potential flights to the Arctic for a joint NOAA/NASA project (Arctic Domain) proposed for 2018. Global ARCHER planning continues as a result of the NOAA Arctic Domain meetings that occurred in early February. A Transport Canada application is in work to support a NASA mission being planned for January to operate from NASA Armstrong and over fly the Arctic region north of western Canada & Alaska to assess a new instrument's performance for measuring snow on sea ice.

## *APH-22 Hexacopter*

**Location:** Bellows Air Force Station, Hawaii

**Mission:** APH-22 Training

Pacific Islands Fisheries Science Center utilizes the airfield at Bellows Air Force Station on the island of Oahu to conduct training and proficiency flights. This allows APH-22 operators to maintain proficiency for future operations at a reduced cost. Training flights are also approved from NOAA small boats.

**Location:** Atlantic Northeast

**Mission:** Emergency Response, Turtles, and Seals

The North East Fisheries Science Center seeks to use the APH-22 hexacopter to respond to entanglements and other unplanned situations involving marine mammals. Photographs will be collected for the purpose of aiding emergency stranding response, event documentation, and photo ID. Unmanned Aerial System (UAS) technologies will also be used to conduct surveys for marine turtles. The intent is to assess the feasibility of using small unmanned rotorcraft to search for turtles in their marine environment both at surface and subsurface. Turtles that are discovered either by the APH-22 or by on-vessel observers will be photographed by the APH-22 and then tagged and or sampled as part of an ongoing study. Turtles may be photographed post-release with the APH-22 to document post-release behavior. NEFSC will also use the APH-22 to conduct surveys of seal haul out sites. Photographs will be collected for the purpose of obtaining local population numbers, documenting seals with evidence of fishery interactions, and collecting photo ID data of seals with brands, wounds, and other distinguishing marks.



**Location:** Seattle, Washington  
**Mission:** Sand Point APH-22 Training

The Marine Mammal Laboratory (MML) intends to begin training flights in the Sand Point area in Seattle, WA. MML has several objectives for the use of the APH-22 hexacopter UAS throughout Alaska. These trips tend to occur in the summer and sometimes fall seasons. In between surveys in the field, it is important that pilots maintain. The Sand Point location will significantly reduce the travel time required and provide more opportunities to meet training requirements.

### ***APH-17 Hexacopter / APH-22 Hexacopter / APO-42 Octocopter***

**Location:** Descanso Ranch, California  
**Mission:** APO-42/APH-22/APH-17 Training

Southwest Fisheries Science Center will be conducting test flights and training flights for the APO-32 Octocopter. Initial flight testing will be conducted under Part 107 and will consist of flight maneuvers, operating in all the control modes, emergency procedures, takeoffs, landings and photogrammetry.

### ***MD4-100 Quadcopter / DJI-S1000 Hexacopter***

**Location:** Oklahoma  
**Mission:** Operational Missions

NOAA's Air Resources Laboratory, Atmospheric Turbulence and Diffusion Division will utilize the MD4-1000 and DJI S-1000 airframes to perform instrument observations using two iMet-XQ temperature/pressure/relative humidity sensors.

### ***SenseFly eBee RTK***

**Location:** Various Locations, East Coast  
**Mission:** Training and Operational Missions

Training on the east coast is expected to continue at the National geodetic Survey's Corban, Virginia facility in preparation for mapping missions in the fall.

### ***Coyote***

**Location:** Avon Park, Florida  
**Mission:** Coyote Operational Flights

The Coyote, built by Raytheon (formerly Sensintel), is a small electric-powered unmanned aircraft with 1-3 hour endurance and capable of carrying a 1-2 pound payload. The Coyote can be launched from a P-3 sonobuoy tube in flight, and terrain-permitting, is capable of autonomous landing and recovery. The Coyote, when deployed from NOAA's P-3s within a hurricane environment, will prove to be a unique observation platform from which the low level atmosphere and boundary layer environment can be studied in great detail.

### ***New Platforms***

**Location:** Lakeland, Florida  
**Mission:** Feasibility Review

Several new aircraft are under review for operational feasibility and airworthiness. These new aircraft will be operated by NOAA's Office of Oceanic and Atmospheric Research, National Ocean Service, and National Marine Fisheries Service once approved by OMAO's Aircraft Operations Center.





# OMAO Partnerships



## ***United States Senate Committee on Commerce, Science, and Transportation***

**Location:** Washington, District of Columbia

**Detail:** LCDR Wendy Lewis, NOAA Commissioned Officer Corps

LCDR Lewis is currently on detail to the Committee with the staff of the Chair, Senator John Thune (R-SD), where she is assisting on activities pertaining to oceans, atmosphere, and fisheries policy, as well as other matters within the Committee's jurisdiction.

## ***National Science Foundation***

**Location:** South Pole, Antarctica

**Mission:** LT Gavin Chensue, NOAA Commissioned Officer Corps

Members of the NOAA Commissioned Officer Corps carry out NOAA's mission in remote locations across the globe. LT Chensue is assigned to Antarctica where he serves as the Station Chief for NOAA's Atmospheric Research Observatory (ARO) at the Amundsen-Scott South Pole Station. The ARO at the Amundsen-Scott South Pole Station is a National Science Foundation facility used in support of scientific research related to atmospheric phenomena.

## ***Department of Defense - U.S. Pacific Command***

**Location:** Honolulu, Hawaii

**Embedded Liaison:** CAPT Barry Choy, NOAA Commissioned Officer Corps

The U.S. Pacific Command (USPACOM) area of responsibility encompasses approximately half the earth's surface and more than half of its population. The 36 nations that comprise the Asia-Pacific include: two of the three largest economies and nine of the ten smallest; the most populous nation; the largest democracy; the largest Muslim-majority nation; and the smallest republic in the world. The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. By any meaningful measure, the Asia-Pacific is also the most militarized region in the world, with seven of the world's ten largest standing militaries and five of the world's declared nuclear nations. Under these circumstances, the strategic complexity facing the region is unique. CAPT Choy is linked closely with the activities within the region allowing for identification of opportunities and cooperation between USPACOM and NOAA, and better overall government function situational awareness in the region.

## ***Department of Defense - U.S. Navy***

**Location:** Washington, DC

**Embedded Liaison:** CDR Jason Mansour, NOAA Commissioned Officer Corps

CDR Jason Mansour serves as NOAA liaison to the Oceanographer of the Navy and is an important interface between the U.S. Navy and other U.S. federal agencies, including NOAA. As NOAA Liaison, CDR Jason Mansour serves as the Head of the Interagency Policy Branch of the International and Interagency Policy Division, Office of the Oceanographer of the Navy, located at the U.S. Naval Observatory. The mission of this Division is to coordinate and execute the Oceanographer of the Navy functions related to policy and programs involving international and/or interagency oceanography. Oceanography includes meteorology, oceanography, mapping, charting and geodesy, astronomy, and precise time, and time interval.

**Location:** Stennis Space Center, Mississippi

**Embedded Liaison:** LTJG Laura Dwyer, NOAA Commissioned Officer Corps

Embedded in the Navy's Naval Oceanography Mine Warfare Center, LTJG Laura Dwyer works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently stationed at Stennis Space Center. This collaboration will provide knowledge and experience that will keep NOAA on the cutting edge of this emerging technology as well as strengthen the partnership between NOAA and the Navy.

## ***Department of Homeland Security - U.S. Coast Guard***

**Location:** Washington, DC

**Embedded Liaison:** CDR G. Mark Miller, NOAA Commissioned Officer Corps

As the NOAA liaison to the United States Coast Guard (USCG), CDR Miller maintains a current and comprehensive knowledge of interagency activities and policies related to the USCG and NOAA. He identifies potential conflicts or benefits issues for analysis and evaluation, conducts appropriate assessments and studies, and serves as the interface between NOAA and the USCG. CDR Miller initiates, designs, and implements strategies through federal agency liaison and coordination that results in cooperative arrangements for maritime security, oceanographic research, hazardous materials spill response, and many other activities.



# Teacher at Sea Program



The mission of the [Teacher at Sea](#) (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique environment for learning and teaching by sending kindergarten through college-level teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Then, armed with new understanding and experience, teachers bring this knowledge back to their classrooms. Since its inception in 1990, the program has enabled more than 800 teachers to gain first-hand experience of science and life at sea. By participating in this program, teachers enrich their classroom curricula with knowledge that can only be gained by living and working side-by-side, day and night, with those who contribute to the world's body of oceanic and atmospheric scientific knowledge. Please access former teacher at sea [blogs](#) which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories.

- To learn about the teachers, read their blogs, and more, please visit <http://teacheratsea.noaa.gov/#/2017/>.
- Applications for the 2018 Teacher at Sea program will be open November 1-30



**Teacher at Sea Kate Schafer from San Jose, California is the final field placement for 2017, sailing on NOAA Ship *Oregon II* on the fourth leg of the shark and red snapper longline survey in the Gulf of Mexico.**

[Photo: NOAA]



# OMAO - NOAA Diving Program



OMAO manages and implements [NOAA's Diving Program](#) (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements with over 100 government agencies and academic institutions. NOAA has more than 400 divers who perform over 14,000 dives per year. The NDP is headquartered at the NOAA Diving Center at the NOAA Western Regional Center in Seattle, Washington.



**NOAA diving students practice towing divers using various techniques in the fall 2017 NOAA Diver Course hosted at the NOAA Diving Center in Seattle, Washington.**

[Photo: Joe Mangiafico/NOAA]





# OMAO Small Boat Program



OMAO manages NOAA's [Small Boat Program](#) and sets policy and provides safety inspections for almost 400 small boats operated by the various Line and program offices throughout NOAA, which support fisheries laboratories, dive support, nautical charting, ocean and Great Lakes research, and more.



**NOAA small boats support many diverse operations across the country.**

[Photos: NOAA]



# Office of Marine and Aviation Operations



*Providing Environmental Intelligence for a Dynamic World*

The personnel, ships, and aircraft of NOAA play a critical role in gathering environmental data vital to the nation's economic security, the safety of its citizens, and the understanding, protection, and management of our natural resources. The NOAA fleet of ships and aircraft is managed and operated by the Office of Marine and Aviation Operations (OMAO), an office comprising civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. NOAA's roots trace back to 1807, when President Thomas Jefferson ordered the first comprehensive coastal surveys. Those early surveys ensured safe passage of ship-borne cargo for a young nation. As the needs of the nation have grown, so too have OMAO's responsibilities. Today, OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircraft. Together, OMAO and the NOAA Corps support nearly all of NOAA's missions.



NOAA has the largest fleet of federal research and survey ships in the nation. The fleet ranges from large oceanographic ships capable of exploring and charting the world's deepest ocean, to smaller vessels responsible for surveying the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities including fisheries surveys, nautical charting, and ocean and climate studies. Based throughout the continental United States, Alaska, and Hawaii, the ships operate in all regions of the nation and around the world.

NOAA's aircraft provide a wide range of airborne capabilities. Our highly specialized Lockheed WP-3D aircraft are equipped with an unprecedented variety of scientific instrumentation, radars, and recording systems for both in situ and remote sensing measurements of the atmosphere, the Earth, and its environment. Equipped with both C-band weather radar and X-band tail Doppler radar systems, the WP-3Ds have the unique ability to conduct tropical cyclone research in addition to storm reconnaissance. Together with NOAA's Gulfstream IV-SP jet, these 'hurricane hunter' aircraft greatly improve our physical understanding of hurricanes and enhance the accuracy of tropical cyclone forecasts. NOAA's light aircraft also play a vital role in monitoring our environment. Our King Air, Turbo Prop Commander, and Twin Otter aircraft support marine mammal population studies, shoreline change assessments, oil spill investigations, and water resource/snowpack surveys for spring flood forecasts.





The NOAA fleet provides immediate response capabilities for unpredictable events. For example, in October 2016, NOAA's WP-3D (N43RF) and G-IV (N49RF) conducted 21 operational missions in seven days into Hurricane Matthew gathering vital data used to improve hurricane track and intensity forecasts. Rapid response by NOAA Ship *Ferdinand R. Hassler* to survey for underwater debris and shoaling that could prove dangerous to deeper draft vessels expedited the opening of the Ports of Charleston and Savannah by the U.S. Coast Guard following the passage of Hurricane Matthew. After the storm, NOAA's King Air (N68RF) flew 14 missions to collect post-storm damage and flooding imagery from Florida to Virginia in coordination with FEMA.

While manned aircraft and sea-going vessels have been, and will continue to be, a primary source of environmental data, new technology will have a significant role to play in the future NOAA fleet. OMAO, in coordination with other NOAA offices and federal agencies, is evaluating and deploying remotely piloted underwater and aircraft systems that could significantly contribute to environmental observations. OMAO's ongoing challenge is to meet the growing demand for in situ scientific data while providing the highest level of service. To better serve the needs of the Nation, NOAA is examining the composition of the fleet through an exhaustive and critical review of at-sea science and observation requirements. Our objective is to develop a clear, cost-efficient path forward to ensure that the NOAA fleet can continue to conduct at-sea surveys and research vital to fisheries management, updating nautical charts, responding to natural and manmade disasters, and understanding coastal and marine systems more fully. Meeting these requirements is essential to developing sustainable, science-based management and conservation plans that protect the health and resiliency of these resources over the long-term.

We continue our efforts to build a civilian and NOAA Corps officer work force that is uniquely qualified to gather critical environmental intelligence and be adaptive and responsive to a changing world and work to expand our partnerships with other federal agencies. For example, NOAA Corps officers are currently assigned to work in the Department of Defense, National Science Foundation, and the U.S. Senate among others where they lend their expertise and service. We also continue to strengthen our partnership with the U.S. Coast Guard. Our basic NOAA Corps officer training class is held at the U.S. Coast Guard Academy, where newly commissioned officers train alongside Coast Guard officer candidates, developing skills and professional relationships that will benefit both services, especially during challenging times. Active collaboration the Federal family is critical to ensuring the long-term capability and success of the federal ocean infrastructure. Our partners' success is our success. The men and women of OMAO and the NOAA Corps provide environmental intelligence for a dynamic world as they serve our nation every day from the farthest seas to the highest skies.



# NOAA Commissioned Officer Corps



– Honor, Respect, Commitment –



The NOAA Commissioned Officer Corps (NOAA Corps) is one of the United States' seven Uniformed Services and as commissioned officers serve with the 'special trust and confidence' of the President. NOAA Corps officers are an integral part of the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. With an authorized strength of 321 officers, the NOAA Corps serves throughout the agency's Line and Staff Offices to support nearly all of NOAA's programs and missions. The combination of commissioned service and scientific expertise makes these officers uniquely capable of leading some of NOAA's most important initiatives. The NOAA Corps is part of NOAA's Office of Marine and Aviation Operations (OMAO) and traces its roots back to the former U.S. Coast and Geodetic Survey, which dates back to 1807 and President Thomas Jefferson. The U.S. Coast and Geodetic Survey Corps was founded in 1917 to provide officers to command U.S. coastal survey ships and field survey parties locally and abroad. In 1970, NOAA was created to develop a coordinated approach to oceanographic and atmospheric research and subsequent legislation converted the commissioned officer corps to the NOAA Corps. The NOAA Corps today provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. Corps officers operate NOAA's ships, fly aircraft, manage research projects, conduct diving operations, and serve in staff positions throughout NOAA. The NOAA Corps celebrates its Centennial year in 2017.

## Benefits of the NOAA Corps to the Nation

The combination of commissioned service with scientific and operational expertise, allows the NOAA Corps to provide a unique and indispensable service to the nation. Discipline and flexibility are inherent in the NOAA Corps personnel system. Officers are trained for positions of leadership and command in the operation of ships and aircraft; in the conduct of field projects on land, at and under the sea, and in the air; in the management of NOAA observational and support facilities; as members or leaders of research efforts; and in the management of various organizational elements throughout NOAA. NOAA Corps officers must be technically competent to assume positions of leadership and command in NOAA and Department of Commerce programs and in the Armed Forces during times of war or national emergency. NOAA Corps officers enable NOAA to fulfill mission requirements, meet changing environmental concerns, take advantage of emerging technologies, and serve as environmental first responders. For example:

- In 2016, NOAA aircraft conducted research and reconnaissance missions into Hurricane Matthew, and post-storm flooding reconnaissance missions from Florida to Virginia with FEMA. NOAA Ship *Ferdinand Hassler* conducted post-storm surveys within of the ports of Charleston and Savannah within 48 hours to re-open the ports to maritime commerce, worth more than \$5M per hour.
- In 2015, NOAA aircraft conducted research and surveillance missions into some of the planet's most extreme weather, ranging from Hurricane Patricia, the strongest on record in the Western hemisphere, to severe storms over the U.S. Great Plains region. In addition, NOAA aircraft responded to unprecedented flooding in South Carolina using advanced sensors and imaging technology to provide emergency response managers with critical real-time information needed to respond to this disaster.
- After Hurricane Sandy in 2012, NOAA Ships *Thomas Jefferson* and *Ferdinand R. Hassler* conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure.
- In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP *Deepwater Horizon* oil spill in the Gulf of Mexico. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.





# Resources



*Please find more information at the following links:*

OMAO – <http://www.omaο.noaa.gov>

NOAA Corps - <http://www.omaο.noaa.gov/learn/noaa-commissioned-officer-corps>

OMAO 101 - <http://www.legislative.noaa.gov/policybriefs/OMAO%20101%20052317.pdf>

NOAA Fleet Update – Find the latest at - <http://www.legislative.noaa.gov/policybriefs.html>

## **Reports and Informational Slide Decks:**

[OMAO Fleet Recapitalization Slide Deck – Building NOAA's 21<sup>st</sup> Century Fleet](#)

[OMAO Fleet Recapitalization Questions and Answers \(Q&As\)](#)

[NOAA Fleet Independent Review Team Final Report](#)

[The NOAA Fleet Plan: Building NOAA's 21<sup>st</sup> Century Fleet](#)

## **Other OMAO Sites:**

OMAO Marine Operations – <http://www.omaο.noaa.gov/learn/marine-operations>

OMAO Aircraft Operations – <http://www.noaaacorps.noaa.gov/>

NOAA Diving Program – <http://www.noaaacorps.noaa.gov/>

OMAO on Facebook - <https://www.facebook.com/NOAAOMAO>

OMAO on Twitter - [http://www.twitter.com/NOAA\\_OMAO](http://www.twitter.com/NOAA_OMAO)

NOAA Ship Tracker - <https://shiptracker.noaa.gov/> (restricted to only .gov or .mil users)